

CLAIMS

1. A signal receiver comprising digitisation means for digitising a received signal and demodulation means (80, 85, 90, 96) for extracting the information content of the digitised received signal, wherein the digitisation means comprises filtering means (30) for dividing the received signal into a plurality of frequency sub-bands, analogue-to-digital conversion means (41 - 45) for digitising the signal in each sub-band, transform means (51- 55) for transforming the digitised signal in each sub-band into the frequency domain, and reconstruction means (51 – 55, 61 – 65, 70) for concatenating in the frequency domain the digitised signal in each sub-band thereby reconstructing the spectrum of the received signal.
- 15 2. A receiver as claimed in claim 2, wherein the reconstruction means (51 – 55, 61 - 65, 70) reconstructs the spectrum of the received signal at a frequency lower than the frequency of the spectrum of the received signal prior to being divided into sub-bands.
- 20 3. A receiver as claimed in claim 1 or 2, wherein the analogue-to-digital conversion means (41 – 45) comprises means for sampling the signal in the i^{th} sub-band at a sample rate f_{s_i} in the range $\frac{2f_{u_i}}{r_i} \leq f_{s_i} \leq \frac{2f_{l_i}}{r_i - 1}$ where f_{u_i} is the upper frequency limit of the sub-band and f_{l_i} is the lower frequency limit of the i^{th} sub-band, and r_i is an integer satisfying the inequality
$$25 I \leq r_i \leq \text{int}\left\{\frac{f_{u_i}}{f_{u_i} - f_{l_i}}\right\}.$$
4. A receiver as claimed in claim 3, wherein the analogue-to-digital conversion means (41 - 45) comprises means for sampling the signal in a plurality of the sub-bands at a common sample rate.

5. A receiver as claimed in claim 3, wherein the analogue-to-digital conversion means (41 – 45) comprises means for sampling the signal in a first sub-set of the sub-bands at a first sample rate and for sampling the signal in a second sub-set of the sub-bands at a second sample rate and wherein the signal in adjacent sub-bands is sampled at unequal sample rates.

10 6. A receiver as claimed in claim 4 or 5, wherein the plurality of sub-bands having a common sample rate have a common bandwidth.

7. A receiver as claimed in any one of claims 1 to 6, wherein the analogue-to-digital conversion means comprises means 41 for digitising a plurality of sub-bands sequentially.

15 8. A receiver as claimed in claim 7, wherein the transform means comprises means (51) for transforming the digitised signal in a plurality of the sub-bands sequentially.

20 9. A receiver as claimed in any one of claims 1 to 8, wherein the reconstruction means comprises means (51 – 55) for selecting a replica spectrum of a sub-band signal and means (51 – 55 or 61 – 65) for re-inverting the replica spectrum if the replica spectrum is inverted.

25 10. A receiver as claimed in any one of claims 1 to 9, wherein the demodulation means comprises means (80) for multiplying the reconstructed received signal by a reference signal in the frequency domain at non-uniformly spaced frequencies.

30 11. A receiver as claimed in any one of claims 1 to 9, comprising down-conversion means prior to the digitisation means for down-converting the received signal from a transmission frequency to a lower frequency.